IMPACTUL UNIVERSITĂŢILOR ASUPRA SISTEMELOR DE INOVARE REGIONALĂ. PERSPECTIVA MEDIULUI DE AFACERI

UNIVERSITIES' IMPACT ON REGIONAL INNOVATION SYSTEMS. AN INDUSTRY'S PERSPECTIVE

Cristina ŞERBĂNICĂ
Postdoctoral researcher at the Bucharest Academy of Economic Studies
Lecturer Ph.D., Faculty of Juridical, Administrative and Communication Studies, "Constantin Brâncoveanu" University, Piteşti
E-mail: cpantelica@yahoo.co.uk

Abstract
This study confronts two perspectives on the role of universities in regional innovation systems. The first one is the political and administrative perspective, under which „higher education institutions, like airports, have become magic bullets in many regional development strategies" (OECD, 2007) or pillars to the EU innovation policy. The second perspective results from industry innovation studies (Innobarometers) and reveals a weak demand from the business community to interact and make use of the knowledge base of universities. Using secondary data analysis, this study brings evidence from empirical studies, official statistics and regional planning documents. The results have implications for regional decision-makers, as well as for regional innovation actors.

***Keywords*:** regional innovation systems, universities/ higher education institutions (HEIs), innovation policies, secondary data analysis, Innobarometers

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Rezumat
Studiul de faţă aşează faţă în faţă două perspective asupra rolului universităţilor în sistemele regionale din inovare. Prima dintre acestea este cea politico-administrativă, conform căreia „universităţile, ca aeroporturile, au devenit ţinte magice în numeroase strategii de dezvoltare regională" (OECD, 2007), precum şi piloni ai Politicii europene de inovare. Cea de-a doua perspectivă rezultă din studiile privind inovarea realizate în mediul de afaceri (Innobarometre) şi evidenţiază o cerere modestă din partea comunităţii de afaceri de a interacţiona şi utiliza baza de cunoştinţe a universităţilor. Studiul foloseşte analiza datelor secundare rezulate din cercetări empirice, statistici şi documente de planificare regională. Rezultatele au implicaţii pentru factorii de decizie la nivel regional, precum şi pentru actorii impicaţi în inovarea regională.

Cuvinte cheie: sisteme de inovare regională, universităţi/ instituţii de învăţământ superior, politici de inovare, analiza datelor secundare, Innobarometre.

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1. INTRODUCTION

The proliferation of innovation system concept opened the debate about the role of universities in the knowledge production and transfer with a territorial dimension. The concept was introduced by Lundvall in 1985, first being associated with national innovation systems (NIS), to describe the way particular institutional frameworks conditioned the technological evolutionary dynamics of the national economy. However, the high degree of centralization in NIS, together with a concentration of investment in R&D in globally competitive locations – the so-called „totemic sites" - have led to the extension of the regional innovation systems (RIS) concept (apud Arbo and Benneworth, 2007). It was assumed that the region is increasingly the level at which innovation is produced through regional networks of innovators, local clusters and cross fertilizing effects of research institutions. In 1998, Cooke, Uranga and Etxebarria explored the case for RIS and concluded that a successful RIS is the one which encourage learning activities at all levels of economic behaviour. Within this context, universities are regarded as more active actors, able to shape regional outcomes and network topologies, rather than merely being pathways linking other actors and recipients of systems determined within national level/ sectoral governance networks.

Despite a theoretical and political emphasis on universities' roles in RIS, there are plenty of examples showing that higher education institutions are a relatively minor source of information and knowledge for creating new products and processes in firms, apart from a small number of high technology fields including biotechnology and Information Technologies (OECD, 2007). For that reason, the literature on RIS has been criticized for generalizing from exceptional cases (e.g. MIT in Boston) and to use these exceptions as a basis for general strategies on the role of universities in an innovation system context. According to Cooke and Morgan (Coenen, 2007) only three cases exist that have sufficient internal coherence, a collective identity and conform to common 'rules of the game' to qualify as real RISs, namely Silicon Valley, Emilia-Romagna and Baden-Wurttemberg. However, the contribution of the RIS approach should not be sought in idealizing and replicating these exemplars. The RIS approach can therefore be seen as a highly appropriate conceptual framework to study innovation deficiencies on the regional level and to identify policy measures to overcome these challenges.

2. UNIVERSITIES' IMPACT ON REGIONAL INNOVATION SYSTEMS. EVIDENCE FROM EMPIRICAL STUDIES

Assuming that universities and other higher education institutions make a significant contribution to regional economic, social and cultural development, the OECD Territorial Development and Public Governance Directorate have conducted comparative reviews on how these issues were addressed in OECD countries, in order to reinforce the partnerships between institutions and regions (OECD, 2007). As regarding universities' roles in regional innovation systems, the study recognises their increasing impact:

"Higher education institutions, like airports, have become "magic bullets" in many regional development strategies, symbolizing significance of the global/ local nexus."

Despite the existing constraints, the new tasks of Higher education institutions have increased as countries have reinforced their apparatus in relation to firms and regional economies, through granting enhanced autonomy and improving framework conditions and incentives to co-operate with the private sector. Case studies from different countries show how a regional dimension can be integrated into public investment in the science base of higher education institutions. For example, in France, Finland, Japan, Mexico and the United Kingdom, national governments have taken steps to identify and support regional centres of innovation. Small and medium-sized enterprises (SMEs), which do not always find it easy to work with large higher education institutions or to engage in the wider research issues raised in universities, were offered access points in universities that can help smooth this process. However, despite all good practices, it is recognised that universities' role is primary indirect: to contribute to business innovation, they need to undertake research contracted out by firms, sell licenses or create start-ups. These trends tend to enhance the interface between firms (especially SMEs) and higher education institutions, which experience significant gaps in their collaborative relationships. First, they may have divergent objectives and priorities, as well as difficulties in identifying partners. Second, universities are not always interested in research topics proposed by firms, whereas firms may favour a more professional approach than the one followed by academia. Third, restrictions on publishing research results may act as a disincentive for higher education institutions (OECD, 2007).

Nine cases studies in five Nordic countries have revealed that universities may exert a strong impact on regional development, but the impact is more local than regional. The size and character of the impact vary between universities and regions. While liberal arts universities mainly have an impact on the public sector, universities with a technical faculty normally exert strong influence on industry in the

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region. It's interesting to note that the university is more important as a source for new industries than as a tool to strengthen the competitiveness of existing industries in the region (Nilsson, 2004).

Additional evidence supports the hypothesis of a minor impact of universities on regional innovation. On contrary to developed countries, the local innovation effects of universities are not significant in transition countries (Bajmocy, Likovics and Vas, 2009). For example, in Hungary (outside of Budapest), by linking the presence of universities to the complex subregional innovation performance, the authors found that the knowledge-producing ability did not result in increased knowledge-exploitation ability. In Hungary, the university-based local economic development programmes are therefore carried out in such an environment, where the knowledge-producing and knowledge-exploiting abilities are spatially departed. The authors have shown that the differences between subregions with and without higher education institutions do not derive from the presence of universities and can be well explained by other factors. In Hungary, in the studied period, higher education institutions cannot be considered as real „resources" of local development.

One other hint has been given by Huggins, Johnston and Steffenson (2008). Universities alone cannot shoulder the burden from transferring the innovative capabilities and knowledge economies of their regions. The European regional policymakers has enhanced policy cooperation and networks. Although universities improve their knowledge transfer effects, the impact on regional development is unclear, since apparent demand from regional business communities to interact and make use of the knowledge base of the higher education sector is weak. Perhaps the most important role of universities continues to be their human capital creation capacity and ability to produce highly skilled employees.

According to Christopherson and Clark (2010), universities can play only a limited role to foster the long-term sustainable economic development. If the region surrounding the university does not have the capacity – in terms of management skills, labor force, market access, reasonably priced public services, or venture capital – to absorb university-produced innovations, then those innovations are likely to end up far from the point of their origination. Although several attempts have been made to uncover whether universities' economic contribution is a rule or rather an exception, certain issues still generate lively debates. First, the empirical evidence is constrained to a few countries and it hardly regards less developed and transition economies, where a number of central and local development strategies are based on the hoped economic development effects of universities. Second, the way of capturing innovation in the econometric models of university knowledge spillovers is often criticized. Third, it is very difficult to carry out nationwide analyses on a low level of territorial aggregation. Therefore, subregional analyses are almost totally absent in the literature.

This study offers additional arguments to the idea that – in spite of an increased focus from European and national authorities, the level of collaboration is far from being a satisfactory one. As research method, the study uses secondary data analysis, which have been defined as "the analysis of data by researchers that will probably not have been involved in the collection of those data, for purposes that in all likelihoods were not envisaged by those responsible for the data collection" (Bryman and Bell, 2007). Data to be interpreted were collected from different official documents describing objectives and progresses in Innovation policy, namely the European Innovation Progress Reports, European Innobarometer and Romanian Regional Innovation Strategies.

3. POLITICAL FOCUS VS. INDUSTRY'S SCEPTICISM

3.2. Evidence form the European Union

The EU innovation policy has placed a strong emphasis on networks, which link the businesses to the surrounding regional environment - universities, research institutes, other firms. Europe 2020 Flagship Initiative Innovation Union stresses the role of universities in generating knowledge, supporting innovation systems and contributing to „smart specialization". Partnerships between higher education institutes, research centres and businesses at the regional level are promoted by all EU support programmes, e.g. Regions for knowledge action in FP7, Innovating actions supported by European Regional Development Fund, Regions for economic change financed from Structural funds, European cluster initiative and so on.

There are also plenty of national and regional initiatives to support the contributions of universities to regional innovation systems. According to ERAWATCH, regional research and innovation policies can be classified into three features: research policies developed by regions and applicable to the region (ex. French competitiveness clusters, German Landers' Higher education programme, Italian technological districts, Spanish regional innovation or technology plans or Sciences Laws etc.), national policies on innovation and/or R&D focused on regions (ex. 2004 Danish action plan "Knowledge moves out – the way to high tech regions", Finish regional strategy for education and research policies until 2013, French state-region plan contracts (CPER), German joint tasks STI policy, Greek GSRT interventions and management, Irish National Development Plan regional focus, Portuguese national research policies with a regional dimension, Swedish VINNOVA's Vinnvaxt Programme (within specific areas), etc. A third feature emerges form R&D activities that are concentrated geographically around Universities/Research centres or capital regions like Bulgarian key academic institutions located around the capital, Czech concentration of R&D investments in Praha region, Greek gathering R&D activities

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around universities and research centres (especially in Attica and central Macedonia), Central Hungarian Region RTDI activities (Budapest and Pest County), Baltic MSs' Estonia, Latvia and Lithuania, R&D concentration in Netherlands' region Noord Brabant (around Philips Company and Einhoven university) or Romania capital region increasing weight, „which create great disparities".

As resulted from the European Innovation Progress Report, in 2009, at the EU-27 level, HEIs research units/centres were the main targets of innovation support measures (Fig. 1):

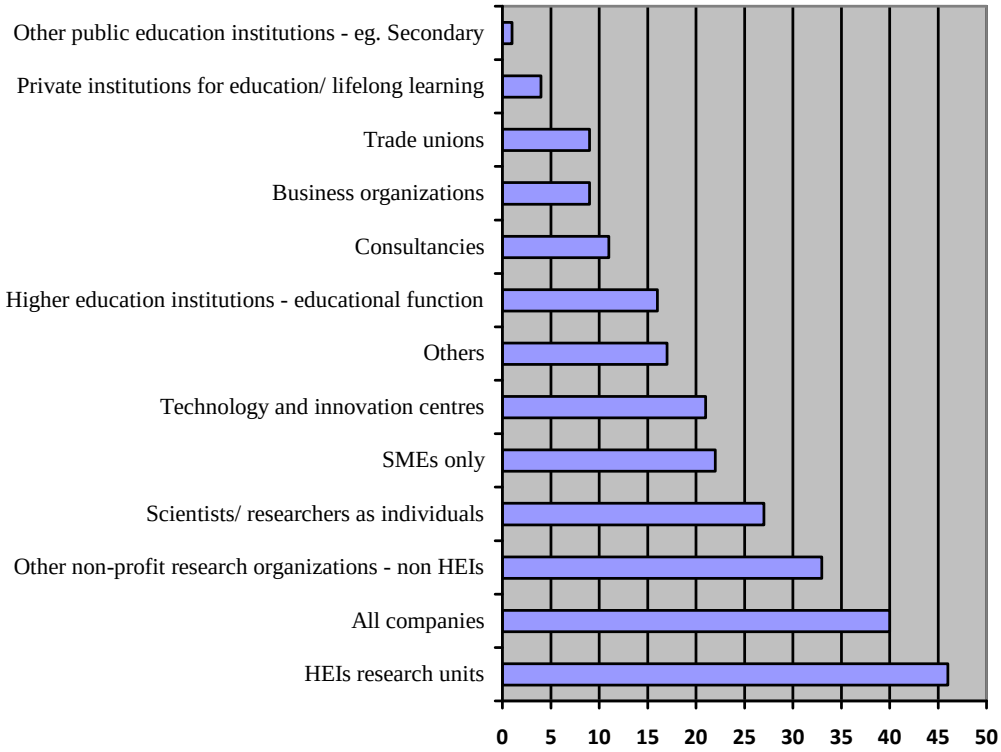

FIGURE 1 - TARGETS OF INNOVATION SUPPORT MEASURES (% OF TOTAL NUMBER OF MEASURES EU27)
Source: European Innovation Progress Report (2009), http://www.proinno-europe.eu/trendchart/european-innovation-progress-report

Despite this political focus, the situation is completely different from industry's point of view and the Innobarometer on *Strategic trends in innovation 2006-2008* brings evidence on the issue. Results indicate that partnerships to support innovation exist particularly within the supply chain, with suppliers (42%), with some specific (presumably large or important) customers or clients (39%). These types of strategic relationship are less frequent with external players in the same field of activity (29%). Links with educational (24%) and research organisations (15%) were less frequently reported.

TABLE 1 - STRATEGIC PARTNERSHIPS TO SUPPORT INNOVATION (EU27, ROW %)

	Some specific customers or clients	Suppliers	Other companies active in their field	Research institutes	Educational institutions
EU27	**39**	**42**	**29**	**15**	**24**

Source: Innobarometer 2009 on Strategic trends in innovation 2006-2008, http://www.proinno-europe.eu/page/innobarometer

By country, Finnish (37%) enterprises were by far the most likely to have built relationships with research institutes to support innovation, but Danish (28%), Czech (26%) and Norwegian (25%) companies were also well above the EU average in this regard. Virtually, no company has developed such relations in Latvia (3%) and only about 1 in 10 did so in Germany (8%), Hungary, Switzerland and France (all 9%), Luxembourg (10%) and Romania (11%). Finnish enterprises were also the most active in building strategic relations with universities or other educational institutions (51%) in support of innovation, followed by Slovenian (44%) and Swedish (39%) firms from the innovation-intensive sectors. Latvian enterprises were the least likely to confirm such strategic relationships (7%). 24% of Romanian companies developed strategic relationships, a percent that equals the EU 27 mean. Additional evidence is brought about this situation from Romania.

3.2. Evidence from Romania

Under the political perspective, the role of universities in innovation is crucial. According to the Romanian National Innovation Strategy, at the center of innovation support actions is co-financing pre-competitive research projects initiated by companies, particularly those that involve collaboration with universities and research institutes, together with actions that support the transfer of research results, creating innovative networks or support for investments in infrastructure. At present, according to the results of 2008 Romanian Innobarometer published by the National Authority for Scientific Research (NASR), Romanian NUT 2 regions are ranked by their innovation potential as presented in Table 2.

TABLE 2 - REGIONAL INNOVATION SCOREBOARD OF ROMANIAN NUT 2 REGIONS

Rank	NUT 2 Region	Score
1	Bucharest – Ilfov	72,49
2	South East	31,73
3	North West	29,56
4	North East	29,44
5	Center	28,90
6	South (Muntenia)	28,04
7	West	26,05
8	South West	21,35

Source: RO INNO (2010), Innobarometru 2008, http://www.roinno.ro/barometru/21.pdf

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The Innobarometer analyzes and ranks regions' ability to create and maintain an environment that supports innovation. The Regional Innovation Scoreboard is presented comparatively for the eight regions and is calculated based on 64 indicators. Of these, 57 are quantitative indicators and seven of them are qualitative ones. Data were obtained from official sources, through exhaustive research, surveys or opinion polls.

Bucharest - Ilfov region distances itself in the domestic landscape of innovation: it focuses both the largest number of universities (a third of the total number of universities in Romania: 36) and the largest expense for research and development in 2008 (62% of total expenditures for research and development in Romania). It is followed by the South East region, which hosts a large number of innovative companies. Between 2004 and 2006, 43.2% of the total enterprises in the region were innovative companies, almost double the national level reported at 21.2%. This situation raises again some questions on the role of universities in promoting innovation, taking into account the fact that the region with the largest number of innovative companies hosts only seven universities (6% of the total number of universities in Romania).

The Study on Innovation in Industry and Services (2006-2008) published by the Romanian National Institute of Statistics highlights a weak cooperation between universities and businesses, despite the increased number of innovative companies: one third of the total number of Romanian companies. However, the purchase of machinery, equipment and software accounted for 84.6% of total innovation expenditures, only 14.1% being allocated for research and development. According to the same study, information in support of innovation processes was obtained mainly from own staff (44.6%) and from suppliers of equipment, materials, components and software (33.0%). Institutional sources were less used: sources from universities were used by 3.9% of innovative companies, while sources from governmental or public research institutions were used by only 3.2%.

As regards cooperation, only 13.8% of all innovative firms have cooperative arrangements for carrying out innovation. The main cooperation partners were suppliers (10.5%) and customers or buyers (8.2%). 5.1% of innovative companies had cooperation agreements with universities/ higher education institutions and only 3% of them with government institutions or public research institutes (See Table 3).

Evidence regarding the weak cooperation between universities and business – results also from an analysis of Regional Innovation Strategies (RIS) that were drafted for six of the eight Romania NUT2 regions, namely Bucharest – Ilfov (BI), North East (NE), North West (NW), West (W), South - Muntenia (SM) and South East (SE).

As strengths, all RIS studies point to the existence of well known research centers (Bucharest Ilfov) or of business incubators and science parks (South East), closely related to the predominant industries in the region (South Muntenia), the technical expertise of universities (North West) or their research potential (West). To these, one can add the training potential for future research specialists and the potential to provide quality business services (North West), together with researchers' commitment and interest to have R&D activities (North East). Strengths are complemented by opportunities related to the European policies to support R&D or to the possibility of accessing structural funds in between 2008 - 2013, through joint collaborative projects.

TABLE 3 - SHARE OF COMPANIES INVOLVED IN COOPERATION, BY SIZE AND PARTENER TYPE

Cooperation partners	Total	Small enterprises	Medium enterprises	Large companies
All cooperation partners	13,8	11,1	15,1	27,3
Partners from inside the company	4,6	2,8	5,3	14,2
Suppliers	10,5	8,2	11,5	22,3
Clients/ Buyers	8,2	6,6	9,2	16,0
Competitiors	4,8	3,4	5,2	12,3
Consultants	4,4	2,2	6,4	13,5
Universities/ Higher education institutions	5,1	3,5	5,3	14,7
Government institutions/ public research institutes	3,0	1,3	3,8	11,8

Source: Institutul Naţional de Statistică, Inovarea în Industrie şi Servicii în perioada 2006-2008, http://www.insse.ro/cms/rw/pages/comunicate/inov_ind.ro.do

However, the weak university – business cooperation, as well as industry's skepticism regarding the innovation potential of universities is evident in all RIS studies.

- Although Bucharest – Ilfov region hosts one third of the universities in Romania, the level of cooperation between R&D units and industry is quite low; there is no correlation between the real needs of the SMEs and the research conducted by universities or research institutes. At the same time, regional entrepreneurs don't know the real benefits of innovation and prefer a short-term vision for their companies.
- The North East analysis highlights the insufficient cooperation between SMEs and universities/ R&D units. The main causes are related to a lack of mutual trust, different perceptions of R&D in universities and businesses, lack of precise and productive channels of cooperation, and, in some cases, of clear institutional communication strategies. In addition, regional entrepreneurs underestimate universities' research potential, while R&D players center their research on national economic issues.

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- In its turn, the Regional Innovation Strategy for the North West region highlights the low level of awareness regarding the innovation benefits. Cooperation with businesses is poor and research centers do not receive applications from companies. There is also a small number of national research and innovation projects that involve business representatives, except technical fields such as chemical engineering, petroleum, pharmaceutical industry, machinery and equipment, computers or food industry. Besides, there are some problems within the technology transfer chain: a reduced number of interface structures, poor cooperation with public authorities and so on.
- Weaknesses in collaboration are also reported in the West Region: few partnerships between R&D providers and companies, low capacity to adapt to market condition, a reduced number of young people who remain in universities and research units to work in research - because they prefer other jobs with higher salaries. Contracts with companies are up to 25% of all contracts undertaken by research centers in the West Region and they bring about 19.65% of total revenues. Not all the institutes in the region have adapted easily to the market economy. Probably, due to their specific profile, some institutions remained dependent on government financing and couldn't find business partners interested in their research results.
- In the South Muntenia Region, local SMEs have partnerships with universities or research institutes, but the level of cooperation is very low. This kind of collaboration is not a priority for regional businesses and most of the partnerships are concluded in order to apply for European programs. Internal sources, the Internet and participation in fairs and exhibitions have been mentioned by regional entrepreneurs as the main information sources for innovation. At the same time, the importance and veracity of information from studies conducted by universities, public research institutions, consultants and business support structures are undervalued.
- The partnership in R&D activities between enterprises and universities/R&D institutions in the South East Region is still at a low level and mainly based on scientific collaborations. The cooperation driven by economic demand is very poor and few projects are financed by private companies. At the same time, regional disparities are very pregnant, and therefore, there is an unbalanced repartition of investments over the region territory. Galati, Tulcea and Constanta are among the most active counties in research and development. For businesses, innovation is a rarely used word.
- There is also some evidence from the other two NUT2 regions in Romania. Thus, according to the Central Region's Development Plan for 2007-2013, there was a dramatic decrease in

collaboration between technology transfer centres at universities and industry after 1990. Economic transformations in the region, together with the lack of appreciated institutions in scientific research and technology transfer are the main reasons of the decrease. At the same time, the South West Development Strategy (2007-2013) points out some weaknesses in cooperation: applied research is limited to large enterprises, research infrastructure is poorly developed and there is a low degree of applicability of universities' research results.

4. CONCLUSIONS AND DISCUSSIONS

This study has confronted two different perspectives on the role of universities in regional innovation systems. The first one is the political perspective, under which „higher education institutions, like airports, have become magic bullets in many regional development strategies" (OECD, 2007). At the same time, universities are seen as pillars of the EU innovation policy and there are plenty of national and regional initiatives to support the contribution of universities to RIS. As highlighted by the European Innovation Progress Report, in 2009, at the EU 27 level, higher education institutions and research units/centres were the main targets of the European policies. The same case for Romania: according to the Romanian National Innovation Strategy, at the center of innovation support actions is co-financing pre-competitive research projects initiated by companies, particularly those that involve collaboration with universities and research institutes.

Despite this political focus, there are plenty of examples showing that higher education institutions are a relatively minor source of information and knowledge for creating new products and processes in firms. At the same time, universities and firms (especially SMEs) experience significant gaps in their relations. As revealed by the Innobarometer on Strategic trends in innovation 2006-2008, partnerships to support innovation exist particularly within the supply chain, with suppliers or some specific customers or clients. On the contrary, strategic links with education and research organizations were less frequently reported.

As regarding Romania, evidence shows no direct links between the number of universities and regional innovation performance. As for example, the South-East region has the second rank in the regional innovation scoreboard, while it hosts only 6% of the total number of universities in Romania. At the same time, sources from universities were used by 3.9% of innovative companies, while none but 5,1% had cooperation agreement with universities and research centres. Poor collaboration between universities and businesses is highlighted in all Romanian Regional Innovation Strategies and there are numerous weaknesses in cooperation: mutual distrust, conflicting objectives, anti-innovation attitudes etc.

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This analysis has implications for both regional decision-makers, as well as for regional innovation actors. As highlighted by Uyarra (2008), a remaining question is how to reconcile and manage the expectations on universities' impacts with the expansion and increasing diversity of higher education institutions. Universities differ in size, status, specialization and focus and thus a more nuanced approach to characterising universities according to well-informed, evidence-based typologies is needed. Policy and research fail to fully comprehend the diversity of universities, and yet this is fundamental to policy design for, clearly, not all universities should aim for the same goals. The policy of one-size-fits all (universities) is not a solution.

A strategy to increase the cooperation between universities and businesses in Romanian regions should be based on a realistic cause and effect analysis. Cooperation can and should be stimulated sequentially, by the elimination of causes that lead to gaps. First, this concerns intermediary structures. At present, there are extremely rare the cases where universities have such structures (eg. business liaison or technology transfer offices) or where they have defined a concrete offer for businesses, in accord with their requirements. Along with creating structures, attention should be paid to changing perceptions and attitudes towards innovation. If a sense of mutual distrust persists, then "forcing" university – business interactions will only serve to stimulate opportunism in accessing funds and not the promotion of sustainable innovation. Last, the establishment of regional structures that support effective innovation is a sine-qua-non condition for the creation of a regional innovation system.

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